

UNCLASSIFIED

AR-003-755

DEPARTMENT OF DEFENCE

DEFENCE SCIENCE AND TECHNOLOGY ORGANISATION

ADVANCED ENGINEERING LABORATORY

MANUAL

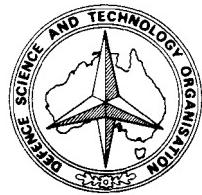
AEL-0219-MA

PROCEDURES MANUAL FOR THE APPROVAL OF DESIGNS
FOR CIVIL AIRCRAFT

N.C. Frost

S U M M A R Y

This manual defines the Design Approval granted to Mr N.C. Frost for the approval of designs in accordance with regulations 40 and 41 of the Air Navigation Regulations.



POSTAL ADDRESS: Director, Advanced Engineering Laboratory,
Box 2151, GPO, Adelaide, South Australia, 5001.

UNCLASSIFIED

Report Documentation Page			Form Approved OMB No. 0704-0188	
<p>Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.</p>				
1. REPORT DATE 1986	2. REPORT TYPE	3. DATES COVERED 00-00-1986 to 00-00-1986		
4. TITLE AND SUBTITLE Procedures Manual for the Approval of Designs for Civil Aircraft			5a. CONTRACT NUMBER	
			5b. GRANT NUMBER	
			5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)			5d. PROJECT NUMBER	
			5e. TASK NUMBER	
			5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Director, Advanced Engineering Laboratory, Box 2151, Adelaide, South Australia, 5001,			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSOR/MONITOR'S ACRONYM(S)	
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited				
13. SUPPLEMENTARY NOTES				
14. ABSTRACT				
15. SUBJECT TERMS				
16. SECURITY CLASSIFICATION OF: a. REPORT b. ABSTRACT c. THIS PAGE unclassified unclassified unclassified			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 14
				19a. NAME OF RESPONSIBLE PERSON

LIST OF AMENDMENTS
(See Section 12)

This document contains 14 sheets and is issued as a bound document. Each reissue shall be as a complete and bound document.

Issue	Date	Amendments
1	Mar 84	Original Issue. (Re-printed Feb 86)

TABLE OF CONTENTS

	Page
1. INTRODUCTION	1
1.1 Purpose	1
2. APPLICABLE DOCUMENTS	1
3. DEFINITIONS	1
3.1 Chief Inspector	1
3.2 Abbreviations	1
4. SCOPE AND CONDITIONS OF APPROVAL	1
4.1 General scope	1
4.2 Exclusions	2
4.3 Design Advice	2
5. AUTHORISED DESIGN SIGNATORY	3
5.1 Signatory	3
5.2 Certification	3
6. DESIGN REQUIREMENTS	3
6.1 D of A requirements	3
7. DRAWINGS	3
7.1 Control	3
7.2 Drawing standard	3
7.3 Register of drawings	3
7.4 Preparation and checking of drawings	3
7.5 Changes to drawings	4
7.6 Drawing release procedure	4
7.7 Distribution of drawings	4
8. CONFIGURATION MANAGEMENT	5
9. EQUIVALENT SAFETY DETERMINATIONS	5

	Page
10. REPORTS	5
10.1 Requirement for a report	5
10.2 Numbering system	5
10.3 Checking of design calculations	5
10.4 Amendments to reports	5
10.5 Distribution of reports	6
11. RECORDS	6
11.1 Register	6
11.2 Design advice numbers	6
11.3 Monthly list	6
11.4 Maintenance of records	7
12. AMENDMENTS	7
12.1 Concurrence	7
12.2 Listing	7
APPENDIX I INSTRUMENT OF APPOINTMENT	8
Figure 1. Approved stamp	4

1. INTRODUCTION

1.1 Purpose

The purpose of this manual is to define the Design Approval granted to Mr Nicholas Colin Frost for the approval of designs in accordance with regulations 40 and 41 of the Air Navigation Regulations. The procedures described herein are mandatory within the AEL.

2. APPLICABLE DOCUMENTS

- 2.1 Air Navigation Regulations (Especially Regulations 40 and 41).
- 2.2 Air Navigation Orders, Part 100 (Especially ANO 100.6).
- 2.3 FAA Advisory Circular AC43.13 Part 2 Chapter 1.
- 2.4 Air Navigation Orders, Part 101.

3. DEFINITIONS

3.1 Chief Inspector

Within the context of this manual the Chief Inspector shall be the Principal Officer, Quality Assurance Group, AEL.

3.2 Abbreviations

D of A	Department of Aviation
ANO	Air Navigation Orders
AEL	Advanced Engineering Laboratory
DRCS	Defence Research Centre, Salisbury
ANR	Air Navigation Regulations
FAA	Federal Aviation Administration (USA)
C of A	Commonwealth of Australia

4. SCOPE AND CONDITIONS OF APPROVAL

4.1 General scope

Mr N.C. Frost has been authorised to approve designs relating to structural aspects of modifications and repairs to aircraft, and may approve:

- (a) Designs of repairs and modifications which comply with Design Standards nominated in ANO's, and which utilise conventional methods of load estimating, structural analysis or simple test.
- (b) Designs in accordance with the limitations and conditions notified by the D of A in respect of a Design Advice.

4.2 Exclusions

The following designs may not be approved unless authorised by a Design Advice:

4.2.1 Designs to aircraft with a maximum take-off weight greater than 5700 kg (12 500 lb).

4.2.2 Designs to rotorcraft control systems, transmission systems or rotors.

4.2.3 Designs involving changes to the vibration, stiffness, flutter, fatigue or fail safe aspects of structures.

4.2.4 Designs affecting aircraft or engine performance or aircraft handling.

4.2.5 Designs affecting cockpit presentation and layout.

4.2.6 Designs affecting crew seating and restraint.

4.2.7 Design utilising unconventional structures or requiring other than conventional stressing techniques or materials formed by novel methods.

4.2.8 Designs of the following systems (other than structural installation aspects):

- (a) Engines,
- (b) Propellers,
- (c) Hydraulic and pneumatic,
- (d) Air conditioning,
- (e) Pressurisation,
- (f) De-icing and anti-icing,
- (g) Fire detection and extinguishing,
- (h) Radio,
- (i) Instruments and Electrical.

4.2.9 Designs which are to be substantiated by test, other than simple load test performed in accordance with FAA Advisory Circular AC43.13 Part 2 Chapter 1.

4.2.10 Designs affecting the Type Approval Status of the aircraft or the aircraft's Flight Manual. (Except Section 6 Loading Data).

4.3 Design Advice

Where a design is outside the scope of paragraph 4.1, a form C of A 2349 Design Advice shall be submitted in duplicate to the D of A.

5. AUTHORISED DESIGN SIGNATORY

5.1 Signatory

Mr N.C. Frost has been appointed as an authorised person for and on behalf of AEL for the purpose of ANRs 40 and 41. He is responsible within the scope, limitations, and conditions prescribed in Section 4 of this procedures manual prepared by AEL and accepted by the D of A, for the approval of designs.

5.2 Certification

The instrument of appointment of Mr N.C. Frost is shown at Appendix I.

6. DESIGN REQUIREMENTS

6.1 D of A requirements

All designs shall be in accordance with the appropriate design standards specified by the D of A in ANO's, or such other requirements as are provided in a reply to a Design Advice.

7. DRAWINGS

7.1 Control

Each repair or modification shall be recorded on drawings, as detailed below, and shall be controlled by a Data List showing all drawings and documents required to incorporate the design and necessary actions.

7.2 Drawing standard

7.2.1 Drawings will be prepared in accordance with standard AEL drawing office practice, except that,

7.2.2 A full set of detailed drawings may be unnecessary to cover many situations (eg a simple one-off structural repair). In this case pictorial drawings, sketches or photographs may be used, together with sufficient information to show clearly the position of the item in the aircraft, and adequately describe the structural details of the repair-modification.

7.3 Register of drawings

A register of approved drawings shall be kept as instructed in Section 11.

7.4 Preparation and checking of drawings

Each drawing will be initialled as follows:

7.4.1 "Drawn" by the draftsman, to certify that the drawings were prepared using standard AEL drawing office practice.

7.4.2 "Checked" by an appropriately qualified person certifying that the applicable dimensions are correct, and that the specified materials, part numbers and finishes are appropriate, and that the drawing meets the drafting standard.

7.4.3 "Approved" by the Project Leader, indicating that the design information provided by the drawing is correct.

7.5 Changes to drawings

7.5.1 Each change to a drawing requires a re-issue of that drawing with a raised issue number. The initial issue of a drawing will be Issue 1.

7.5.2 The raised issue drawings will be distributed to the original recipients as defined in paragraph 7.8. Provision is made on the "Approval" stamp for raising the issue of a drawing. This permits a true copy to be amended without necessarily obtaining a reprint from the original. Such amendments will be made in ink.

7.6 Drawing release procedure

7.6.1 Each copy of the drawing will be stamped "Approved" in a distinctive colour, dated and signed by the Authorised Design Signatory to certify that the drawing is approved under ANR 40 or ANR 41.

7.6.2 The format of the approved stamp to be used by AEL is shown at figure 1.

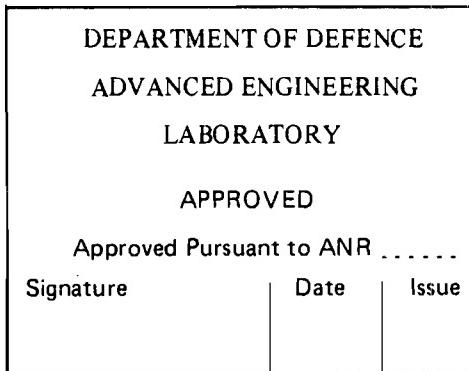


Figure 1. Approved stamp

7.7 Distribution of drawings

7.7.1 Approved drawings will be distributed:

2 copies to the Maintenance or Manufacturing organisation, one of which will be retained by the Chief Inspector, or his equivalent in that organisation. (See Section 3). 1 copy will be filed by the Authorised Design Signatory.

7.7.2 Where D of A approval is required, application shall be made according to ANO 100.6 Sub-section 3. Copies of drawings approved by D of A may be certified by a "true copy" stamp and date.

8. CONFIGURATION MANAGEMENT

Configuration management procedures will conform to the requirements of AEL standard procedures. Control will be effected by issue of Engineering Orders, Drawings and Data lists, and variations from the design by concessions and production permits.

9. EQUIVALENT SAFETY DETERMINATIONS

Requests for equivalent safety determinations are to be made by forwarding three copies of D of A Form 560, together with supporting material, to the Regional Office, D of A.

10. REPORTS

10.1 Requirement for a report

A report must be prepared on each of the following occasions:

10.1.1 Subsequent to any repair or modification where airworthiness justification is required.

10.1.2 Whenever revision to an existing Manual or the introduction of new Manuals is undertaken to cover the installation, operation or maintenance of specialised items of equipment.

10.1.3 Whenever flight testing is done to cover the characteristics of the aircraft or of new equipment being flight tested.

10.1.4 Whenever the Authorised Design Signatory, D of A or an airworthiness officer of the D of A feel that in their opinion the preparation of an engineering analysis is necessary.

10.2 Numbering system

10.2.1 Report numbers shall consist of four digits followed by R and three digits. Eg (0033-R-001). The first four digits signify the Project Number, R signifies a Report, and the last three digits are the report number.

10.2.2 No two reports shall bear the same number unless the report is a copy of an original which has been raised in issue.

10.3 Checking of design calculations

The checking of design calculations is required and it is the Authorised Design Signatory's responsibility to ensure that the checking is adequate and carried out by a competent person.

10.4 Amendments to reports

10.4.1 When a report is changed it shall be raised in issue.

10.4.2 The initial issue will be "Issue 1".

10.4.3 The raised issue will be distributed to the original recipients as defined in paragraph 10.5. Provision is made on the "Approval" stamp

for raising the issue of a report. This permits a true copy to be amended without necessarily obtaining a reprint from the original. Such amendments will be made in ink.

10.5 Distribution of reports

Reports relating to designs within the scope of the Authorised Design Signatories Approval (paragraph 4.2) will be distributed:

10.5.1 One copy to the Maintenance or Manufacturing organisation to be retained by the Chief Inspector or his equivalent in that organisation (See Section 3).

10.5.2 One copy will be filed by the Authorised Design Signatory.

10.5.3 Reports relating to designs subject to Design Advice action (see paragraph 4.3) will be sent to the D of A (2 copies). The Department, if satisfied, will approve all copies, keeping one copy and returning the remaining one to AEL to be held by the Authorised Design Signatory.

10.5.4 Copies will be provided by the Authorised Design Signatory stamped with "Certified True Copy of DOA approved document".

11. RECORDS

11.1 Register

11.1.1 The Authorised Design Signatory will maintain 1 copy of a register in which the following information will be kept for all approved or provisionally approved drawings and reports.

11.1.2 The columns of the register will be:

Column	Column Title
1	Drawing Title
2	Drawing Number
3	Drawing Issue Number
4	Drawing Date of Issue
5	Aircraft Registration Number
6	Aircraft Make and Model
7	Report Number
8	Report Issue Number
9	Report Date of Issue
10	Design Advice No (if applicable)
11	Distribution of Drawings
12	Distribution of Reports

11.2 Design advice numbers

The Design Advice number will be allocated from this register and will be numbered sequentially from AEL100.

11.3 Monthly list

A monthly list of drawings, EO's and data lists approved by the Authorised Design Signatory for AEL is to be submitted to the D of A. A nil return is to be furnished for any month in which no design data is approved.

11.4 Maintenance of records

Drawings, calculations and reports shall be kept indefinitely for each design unless superseded by raised issues.

12. AMENDMENTS

12.1 Concurrence

Amendments to this manual shall be advised to the D of A (Airworthiness) for concurrence prior to incorporation in the manual.

12.2 Listing

Agreed amendments shall be listed on page i of this manual.

APPENDIX I

INSTRUMENT OF APPOINTMENT



AIR NAVIGATION REGULATIONS

COPY

INSTRUMENT OF APPOINTMENT OF AUTHORISED PERSON

In pursuance of the powers delegated to me under Regulation 9 of the Air Navigation Regulations, I John Charles FINCHER, the Superintendent of Airworthiness, Victoria/Tasmania Region of the Department of Aviation HEREBY APPOINT, Nicholas Colin FROST while in the employ of Department of Defence, Defence Science and Technology Organisation, as an authorised person for the purposes of Regulations 40 and 41 of the Air Navigation Regulations SUBJECT TO the limitations which are set out in Manual AEL-0219-MA Issue 1 dated 30 March 1984. This instrument supersedes and cancels the previous instrument dated 23 February 1977.

Dated this first day of May
One thousand nine hundred and eighty-five.


J.C. FINCHER
SUPERINTENDENT OF AIRWORTHINESS
VICTORIA/TASMANIA REGION
DEPARTMENT OF AVIATION

DOCUMENT CONTROL DATA SHEET

Security classification of this page

UNCLASSIFIED

1 DOCUMENT NUMBERS		2 SECURITY CLASSIFICATION	
AR Number: AR-003-755		a. Complete Document: Unclassified	
Series Number: AEL-0219-MA		b. Title in Isolation: Unclassified	
Other Numbers:		c. Summary in Isolation: Unclassified	
3 TITLE		PROCEDURES MANUAL FOR THE APPROVAL OF DESIGNS FOR CIVIL AIRCRAFT	
4 PERSONAL AUTHOR(S):		5 DOCUMENT DATE: February 1986	
N.C. Frost		6.1 TOTAL NUMBER OF PAGES	
		6.2 NUMBER OF REFERENCES: -	
7 7.1 CORPORATE AUTHOR(S): Advanced Engineering Laboratory		8 REFERENCE NUMBERS	
7.2 DOCUMENT SERIES AND NUMBER Advanced Engineering Laboratory 0219-MA		a. Task: ASE INDIRECT b. Sponsoring Agency: DSTO	
9 COST CODE: 661TS820			
10 IMPRINT (Publishing organisation) Defence Research Centre Salisbury		11 COMPUTER PROGRAM(S) (Title(s) and language(s))	
12 RELEASE LIMITATIONS (of the document): Approved for Public Release			

Security classification of this page:

UNCLASSIFIED

Security classification of this page:

UNCLASSIFIED

13 ANNOUNCEMENT LIMITATIONS (of the information on these pages):

No limitation

14 DESCRIPTORS:

a. EJC Thesaurus
Terms Aircraft
 Aircraft maintenance
 Design standards

15 COSATI CODES:

01030

b. Non-Thesaurus

Terms Aircraft modification

16 SUMMARY OR ABSTRACT:

(if this is security classified, the announcement of this report will be similarly classified)

This manual defines the Design Approval granted to Mr N.C. Frost for the approval of designs in accordance with regulations 40 and 41 of the Air Navigation Regulations.

Security classification of this page:

UNCLASSIFIED